Site 245 Clark Pond

Overview: Clark Pond is located on the eastern shore of Great Neck in the Town of Ipswich. The 32-acre coastal pond and fringing wetlands are separated from Plum Island Sound by a narrow barrier beach. A low berm with a spillway was reportedly constructed across the outlet in the 1920's to enhance waterfowl habitat for hunting. The outlet is currently obstructed by a dense stand of *Phragmites* as well as fine sediments which tend to accumulate at the northern end of the barrier beach system. The obstructed flow, combined with high discharges from the pond following a major coastal storm, resulted in the creation of a second channel south of the previous location. The height of the existing berm and spillway appears to only allow tidal exchange during major coastal flooding events. The roadway used by the Association of Great Neck (AGN) to access the small parking area for the beach is reportedly rarely overtopped. The extremely limited tidal exchange accounts for the fresh water conditions within the pond. The fresh water conditions support a fringe of both narrow-leaved (*Typha* and *Phragmites*) and broad-leaved emergent (*Pontederia*) plants. Pickerelweed typically tolerates salinity levels no higher than 3 ppt. The emergent fringe to the pond is supported on a very poorly drained organic soil. The pond itself is generally very shallow and supports beds of submerged aquatic vegetation (primarily *Potamogeton* sp.). The substrate within the central portion of the pond is more firm with less accumulated organic material. In the summer of 2005, the pond experienced a pronounced bloom of brown filamentous algae.

Both the 1853 Coastal Survey and the 1893 USGS 15 Minute Series Salem, MA Quadrangle map show the site as a coastal embayment open the Plum Island Sound. The 1910 coastal survey depicts the site as a fresh water pond and shows a channel in the approximate location of the existing outlet. It is unclear whether the condition depicted on this mapping was the result of human activities or the nature accumulation of sediment and debris at the northern end of the barrier beach system. Construction of the low berm (reportedly in the 1920's) further isolated the pond from tidal influences. Based on a comparison of the 1910 survey and current conditions, it appears that the berm may have increased water levels in the pond. Contrary to current conditions, the 2001 aerial photography shows a more open channel extending to the Sound from the spillway. The site is currently owned by the AGN. Past efforts to acquire the pond by a partnership involving DCR through a US Fish and Wildlife Service grant have not advanced and are considered unlikely at this time (S. Colby, Association of Great Neck, pers. comm.).

Structure conditions: A low berm with a spillway was reportedly constructed across the outlet in the 1920's by the Clark family to enhance waterfowl habitat for hunting. The low berm consists of a 250 foot laid stone wall. The spillway is approximately 2 ft wide and 1 ft deep and at time of inspection was partially blocked by fiberglass debris from a wrecked boat. The berm and spillway have partially deteriorated in a few locations but are generally in fair condition despite their age. The dense emergent vegetation found on both sides of the berm reduces scour potential to the berm. The outlet is currently obstructed by dense growth of *Phragmites* as well as fine sediments which tend to accumulate at the northern end of the barrier beach system.

Ecological Integrity: Historical mapping suggests the site was previously a coastal embayment connected directly to the Sound at the location of the existing berm and spillway. Despite the presence of *Phragmites* within the fringing marsh and infrequently occurring algae blooms, the site is considered to have a moderate level of ecological integrity. Overall, the pond appears to be functioning well as a fresh water wetland habitat within the coastal zone

Although the site is not held as conservation lands, the property is maintained by the AGN for recreational purposes. The site is contained within the Parker River/Essex Bay ACEC and mapped as BioMap Supporting Natural Landscape. The site is currently not mapped by the State as supporting listed species, however there are reports of several rare species occurrences including the king rail (W. Castonguay, TTOR, pers. comm.). The intertidal flats along the adjacent barrier beach are mapped as suitable habitat for soft-shelled clam. Surrounding land uses are high density residential, undeveloped forest lands and recreational lands along the barrier beach.

Reportedly, algae blooms of the magnitude observed in the summer of 2005 are a rare occurrence and may be related to increased soil disturbance within the watershed from development activity and land clearing done by the Air Force (W. Castonguay, TTOR, pers. comm.). The site also appears to support a large forage fish population. It has been reported that the pond may receive as 40% of the total water budget from the storm drain system. There are four catch basins discharging into the pond. Consequently, the pond is susceptible to land management practices within the contributing watershed. The shallow pond supports beds of submerged aquatic vegetation and a fringe of both narrow-leaved (*Typha* and *Phragmites*) and broad-leaved emergent (*Pontederia*) plants. An important impairment to the site is the extensive stands of *Phragmites* along the eastern edge of the pond. Loosestrife also appears to be increasing in density within the pond and small digressional wetland areas immediately west of the barrier beach.

Controlling the population of *Phragmites* by the introduction of regular tidal flushing may be difficult to achieve solely through restoration of the creek and tidal exchange in the original location and/or the installation of culverts under the beach access road. The current elevation of *Phragmites* stands fringing the pond appears to be higher in elevation than typical spring tides and therefore may not be affected by higher salinity levels. The stand of *Phragmites* occurring below the berm may benefit from the maintenance of the creek as it occurs at a somewhat lower elevation. In addition to the introduction of more saline water, the activity would result in better drainage of freshwater from the wetland and increased hydrologic flushing of the system. Better flushing and drainage of excess surface water from the pond may reduce fluctuating water levels which are conducive to invasive species and reduce residence time within the pond which may enhance water quality. Promoting more regular and concentrated discharge from the pond would also help to flush out fine sediment that currently accumulates within the creek and reduces flow capacity.

Socioeconomic: Recreational values of the site are limited by the limited public access and parking. Educational opportunities are enhanced by the recreational status, however there are no nearby schools. The site's Uniqueness/Heritage value is generally considered high as an uncommon freshwater wetland community within the coastal zone. The site is contained within an ACEC and reportedly supports State-listed wildlife species. The site does not include any known cultural resource elements or urban setting values.

Construction Logistics/Feasibility: Further data is necessary to assess the feasibility of restoring tidal influence to Clark Pond. However, maintenance of the creek from the existing spillway along with additional ditching within the *Phragmites* stand downstream of the berm would likely provide immediate ecological benefits. Reestablishing the original flow path will also help the AGN maintain pedestrian access to the barrier beach. It may also be possible to direct the flow away from the low retaining wall behind the last house off Bowdoin Road which could be undercut from increased velocities. In addition, there may be some opportunities to improve

water quality in the pond by implementing stormwater treatment BMPs in the closed drainage system.

The overall constructability for this relatively small scale effort is considered high. The site has excellent access and staging via Bowdion Road. The work would involve the maintenance of approximately 600 liner feet of obstructed tidal creek. Soil conditions will require the use of low-ground pressure excavation equipment commonly used by the Mosquito Management District. The work would also include minor repairs to the existing berm. The work would not involve any utilities or low-lying abutters. Material removed from the site will have to either disposed of on site (reducing restoration area), or hauled off site to a suitable disposal location. The total construction cost associated with this limited construction activity is estimated to be $35,000. Costs associated with stormwater BMPs, such as water quality inlets within the closed drainage system, are difficult to estimate at this stage.

Restoration Potential: The implementation of the limited creek maintenance program is considered to have a moderate restoration potential. Although limited in scope, the maintenance of the creek from the existing spillway in the berm would likely provide valuable ecological benefits including limited control of the large *Phragmites* stand downstream of the berm and reducing water level fluctuations and water residence time within the pond. The current broad flow path of surface waters exiting the pond also impacts access to the beach from Bowdoin Road. These improvements would likely be supported and possibly funded by the AGN. There are no known impediments to implementing this work. Without these restoration measures, the stand of *Phragmites* downstream of the berm will likely continue to expand to the south and result in the loss of maritime grassland and shrubland communities. Future steps leading toward project implementation should focus on more detailed elevation information along the creek system and within the pond to confirm the preliminary findings above. Additional coordination with the AGN should focus on joint funding opportunities.

Further data is necessary to assess the broader restoration potential of introducing regular tidal exchange into Clark Pond. This information should include a better understanding of elevations within the pond and surrounding wetlands with respect to tidal datums, influence of coastal processes on sediment transport, extent of water quality impairments, likely benefits from watershed planning initiatives, relative values and sustainability of uncommon wildlife habitat elements, available control mechanisms for invasive species, and compatibility with current recreational land uses.

Site # 245 | Site Features | Scale: 1:6,000

Photo 1 - Beach Parking Access Road

Photo 2 - Northern End of Pond Viewing North

Photo 3 - Central Portion On Pond East

Photo 4 - Clark Pond Viewing North

Photo 5 - Southern End of Pond

Photo 6 - Berm at Remnant Channel

Photo 7 - Boardwalk Over Remnant Channel

Photo 8 - Downstream End of Remnant Channel

Photo 9 - Secondary Channel from Pond

Great Marsh Coastal Wetlands Restoration Planning
Rapid Field Assessment

Site # 245
Clark Pond

Site Information

Site ID:	245
Site Name:	Clark Pond
Municipality	Ipswich
Location:	Eastern shore of Great Neck
Adjacent Waterbody:	Ispwich River

Affected Area (Acres)

Mudflat/Open Water:	21.4	Total Area:	31.7
Salt Marsh:	0.1		
Other Wetland:	10.2	*Other Description:*	
Other:	0		

Impairment(s)

Tidal Restriction	☑	Fill	☐
Obstructed Ditche(s)	☑	Invasive Species	☑
Impoundment	☑	Pollution / Siltation	☑

Severity of Impairments: Moderate

Project Type

Roadway Culvert(s)	☐	Obstructed Ditches	☑
Bridge	☐	Fill	☐
Berm	☑	Other	

Evidence of Restriction

Gauge Data	☐	Impounded Flow	☑
Downstream Scour Pool	☐	Obstructed Flow	☑
Upstream Scour Pool	☐	Invasive Species	☑
Bank Erosion	☐	Ponded Conditions	☑
Slumping	☐	Subsidence	☐

Structure / Channel:

Overall Condition:	Fair
Life Expectancy (Years):	10
Road Condition:	None
Structure Type:	stone berm
Structure Age (Years)	80
Structure 1 Width (Feet):	
Structure 1 Length (Feet):	
Structure 2 Width (Feet):	
Structure 2 Length (Feet):	
Skew (Degrees):	
Cover (Feet):	
Scour Protectection:	☐
Adequately Aligned:	☐
Headwall Type:	
Headwalll Condition:	

Ecological Integrity / Habitat Value

Surrounding Land Use %

Commercial / Industrial	0
Residential	40
Agricultural	0
Undeveloped	60

Severity of Impairment(s)	Moderate
Invasive Plant Cover:	Medium
Extent of Wooded Buffer:	Fair
Habitat Connectivity:	Fair
NHESP Estimated Habitats of Rare Wildlife:	☐
NHESP Priority Habitats of Rare Species:	☐
NHESP BioMap Core Habitat:	☐
NHESP BioMap Supporting Natural Landscape:	☑
ACEC:	☑
Anadromous Fish:	☐
Shellfishing Suitability:	☑
Barriers to Fish Passage	Moderate

Great Marsh Coastal Wetlands Restoration Planning

Rapid Field Assessment

Site # 245
Clark Pond

Construction Logistics / Feasibility

Traffic Volume	
Detour Potential	☐
Site Access	Good
Staging Areas	☑
Fill Material Concern	Minimal
Low Lying Property Concerns	Minimal
Overhead Utility Constraint	None

Underground Utilities

Water	☐	*Telephone*	☐
Gas	☐	*Sewer*	☐
Electric	☐	*Drainage*	☐

Permitting Complexity	Medium
Local Support	Yes
Feasibility Cost	15,000
Design Cost	15,000
Permitting Cost	15,000
Construction Cost	35,000
Total Cost	80,000
Relative Cost/Acre	53,000

Socioeconomic

Recreation

Public Access:	☐
Watercraft / Portage:	☐
Wildlife Viewing:	☑

Education

Schools Nearby:	☐
Ongoing Research:	☐
Education / Outreach Potential:	Medium
Saftey Concerns (Access):	Low

Uniqueness / Heritage Value

Rare Species Habitat:	☑
ACEC:	☑
Cultural Resource Features	☐
Urban Viewscape Value:	None
Urban Habitat Value:	None

Tide Surveys

	Start:		*Finish:*
Dates of 1st Survey:		-	
Date of Highest Tide:			
Max Measured Tidal Dampening:			
Percent of Tidal Prism:			
Measured Delay:			

	Start:		*Finish:*
Dates of 2nd Survey:		-	
Date of Highest Tide:			
Max Measured Tidal Dampening:			
Percent of Tidal Prism:			
Measured Delay:			

Summary

Uniqueness / Heritage Value:	High	Ecological Integrity:	Medium
Recreational Value:	Medium	Logistics / Feasibility:	High
Educational Value:	Medium		

Restoration Potential: Moderate